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**Kaye et al.**

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(54) **SYSTEMS AND METHODS FOR PROVIDING  
PATIENT MEDICATION HISTORY**

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(\*) Notice: Subject to any disclaimer, the term of this  
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**G06Q 50/00** (2012.01)

(52) **U.S. Cl.**  
USPC ..... **705/3; 705/2; 705/4**

(58) **Field of Classification Search**  
USPC ..... **705/2/3, 2-4**  
See application file for complete search history.

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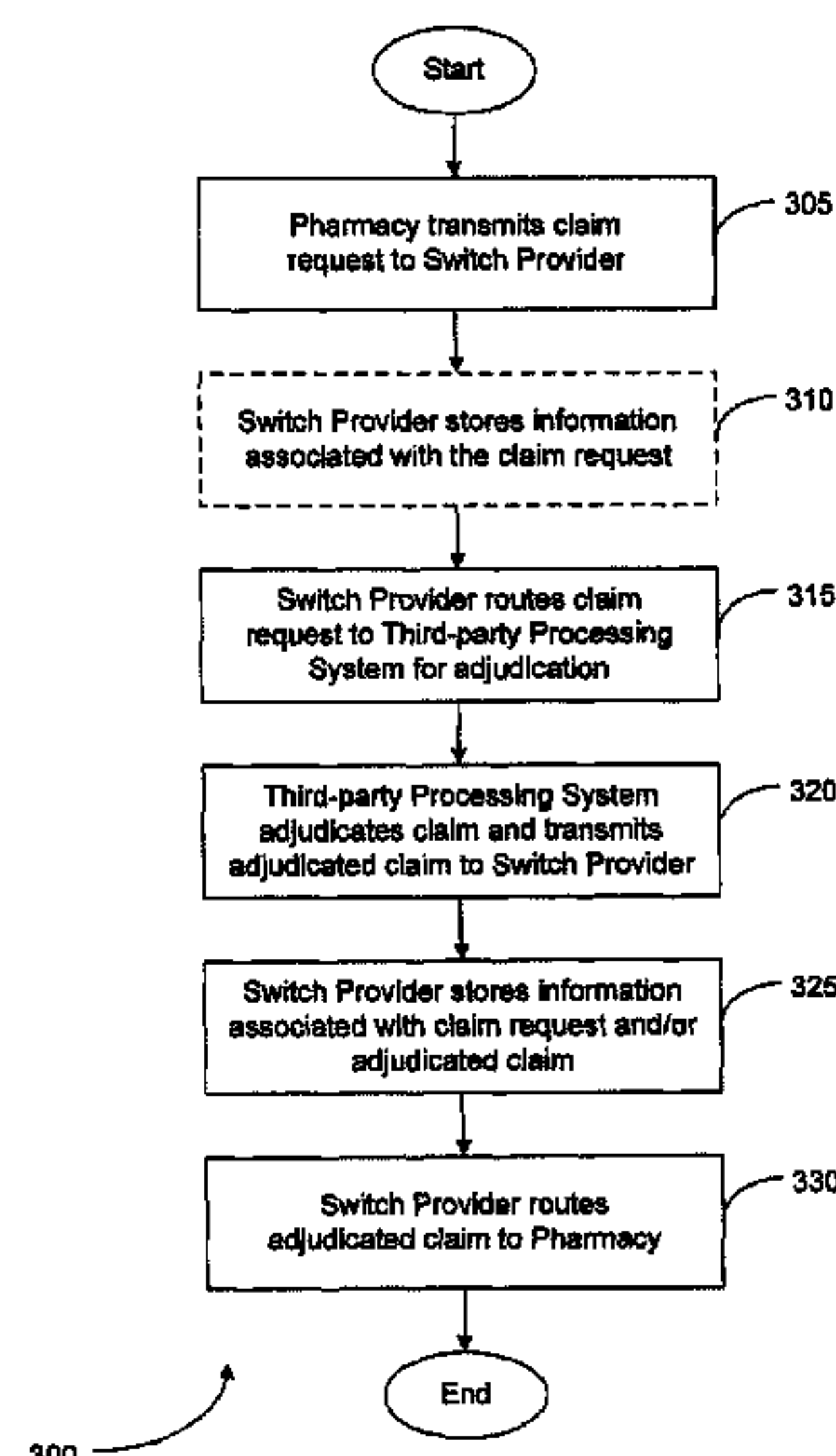
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(57) **ABSTRACT**

Systems and methods may be provided for obtaining and  
providing patient medication history. The systems and meth-  
ods may include receiving a request for medication history  
information of a patient, the request including identification  
information for the patient. At least one memory may be  
accessed utilizing at least a portion of the identification infor-  
mation, the at least one memory including information asso-  
ciated with pharmacy claims transactions stored in the at least  
one memory in near real time as the pharmacy claims trans-  
actions are processed. Information associated with the medi-  
cation history of the patient is obtained from the at least one  
memory and communicated in response to the received  
request.

**17 Claims, 14 Drawing Sheets**



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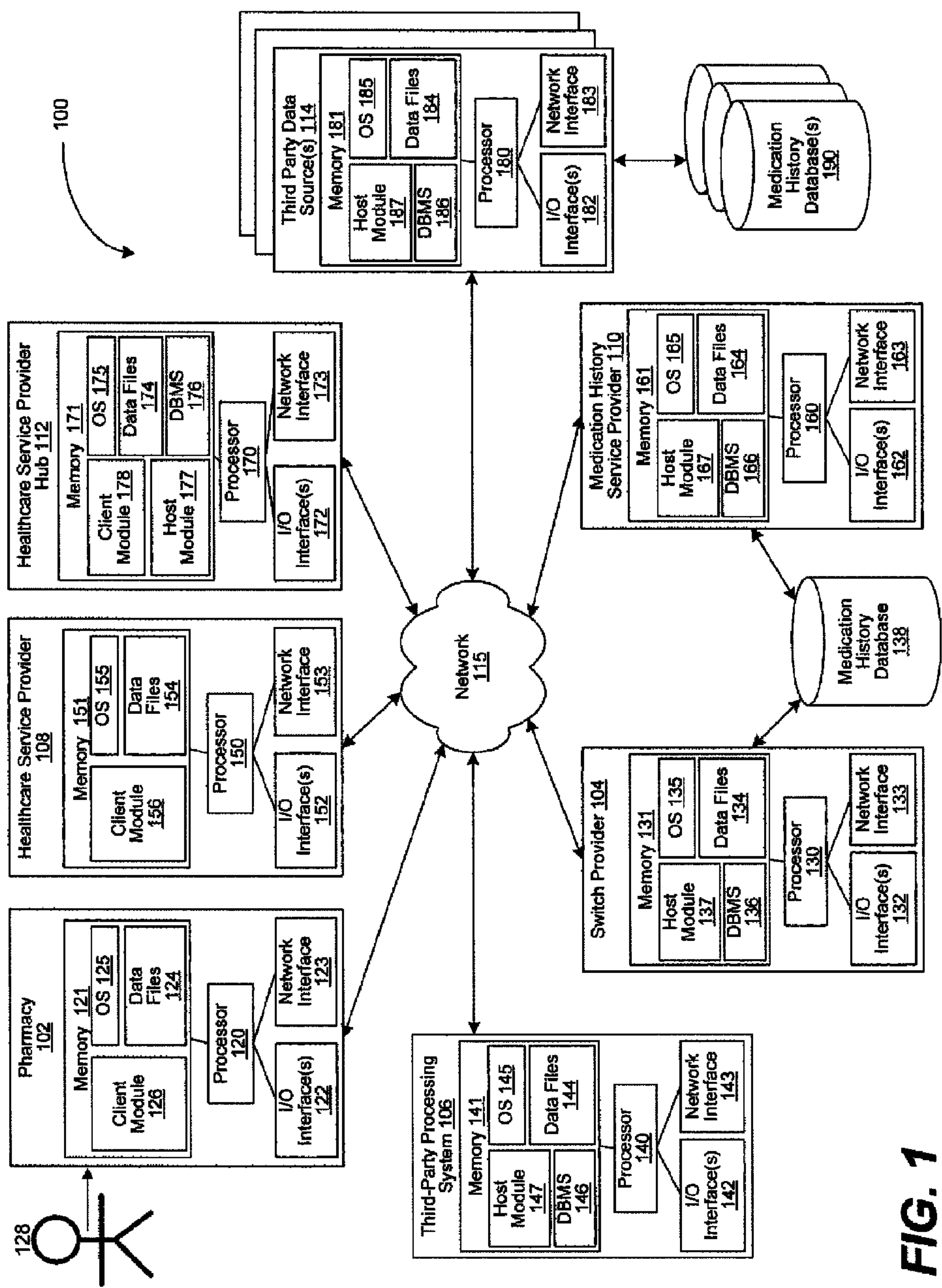


FIG. 1

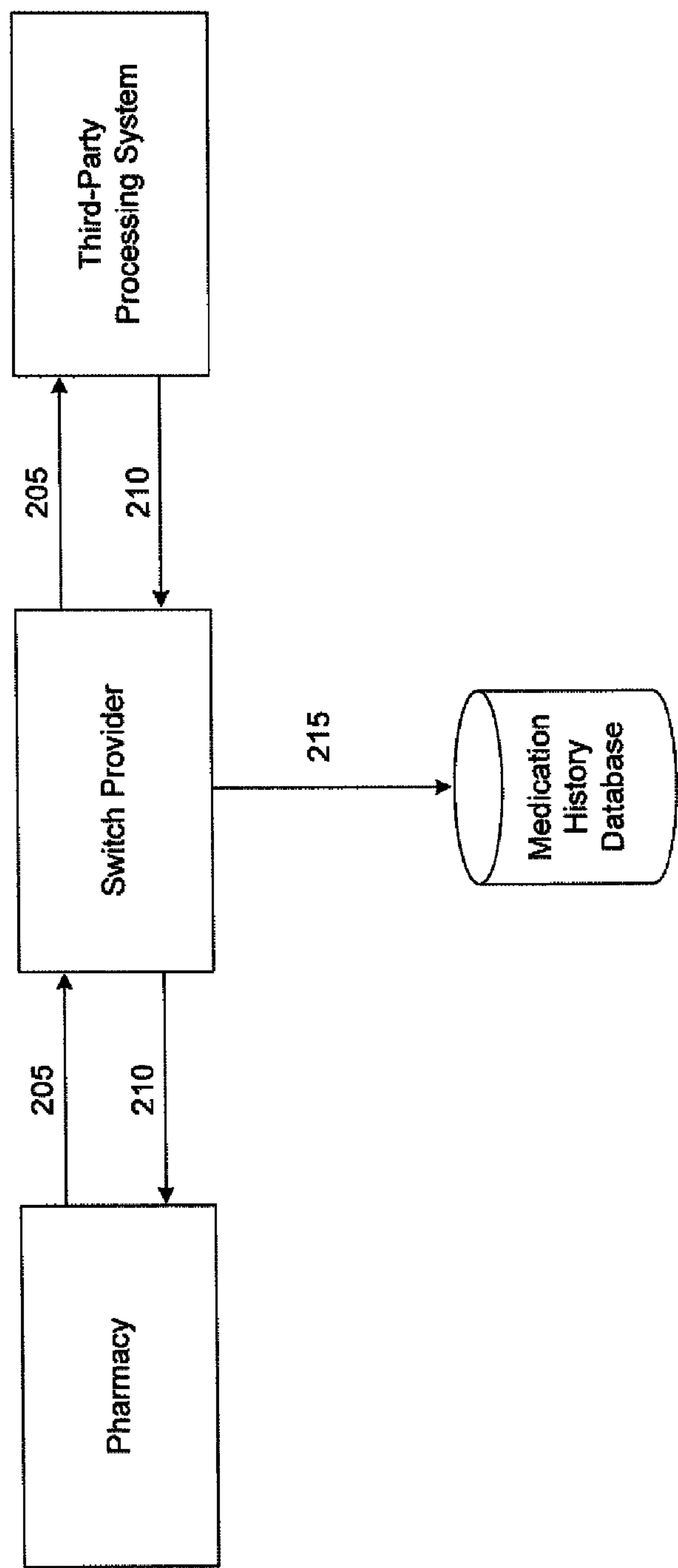
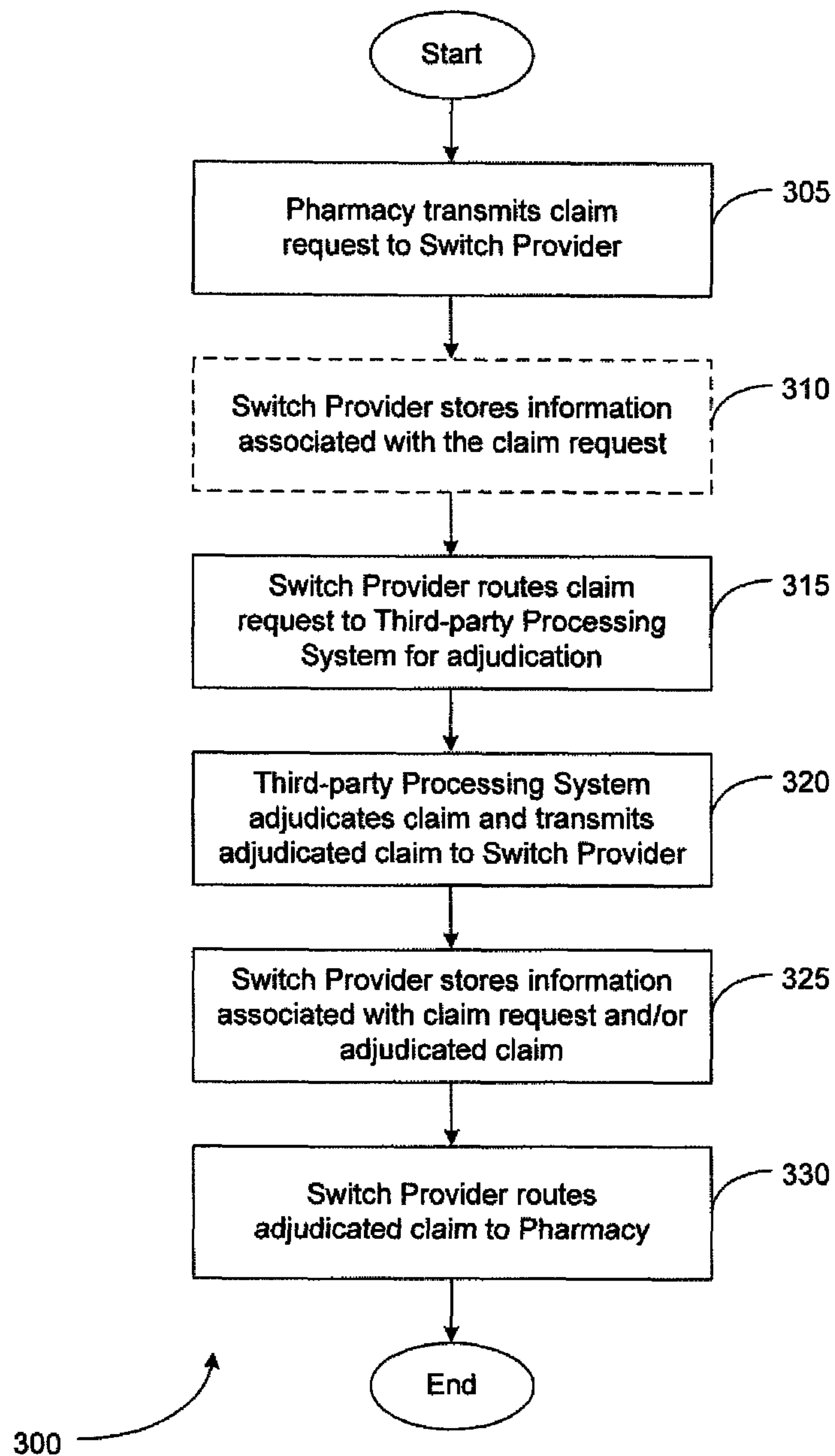


FIG. 2

**FIG. 3**

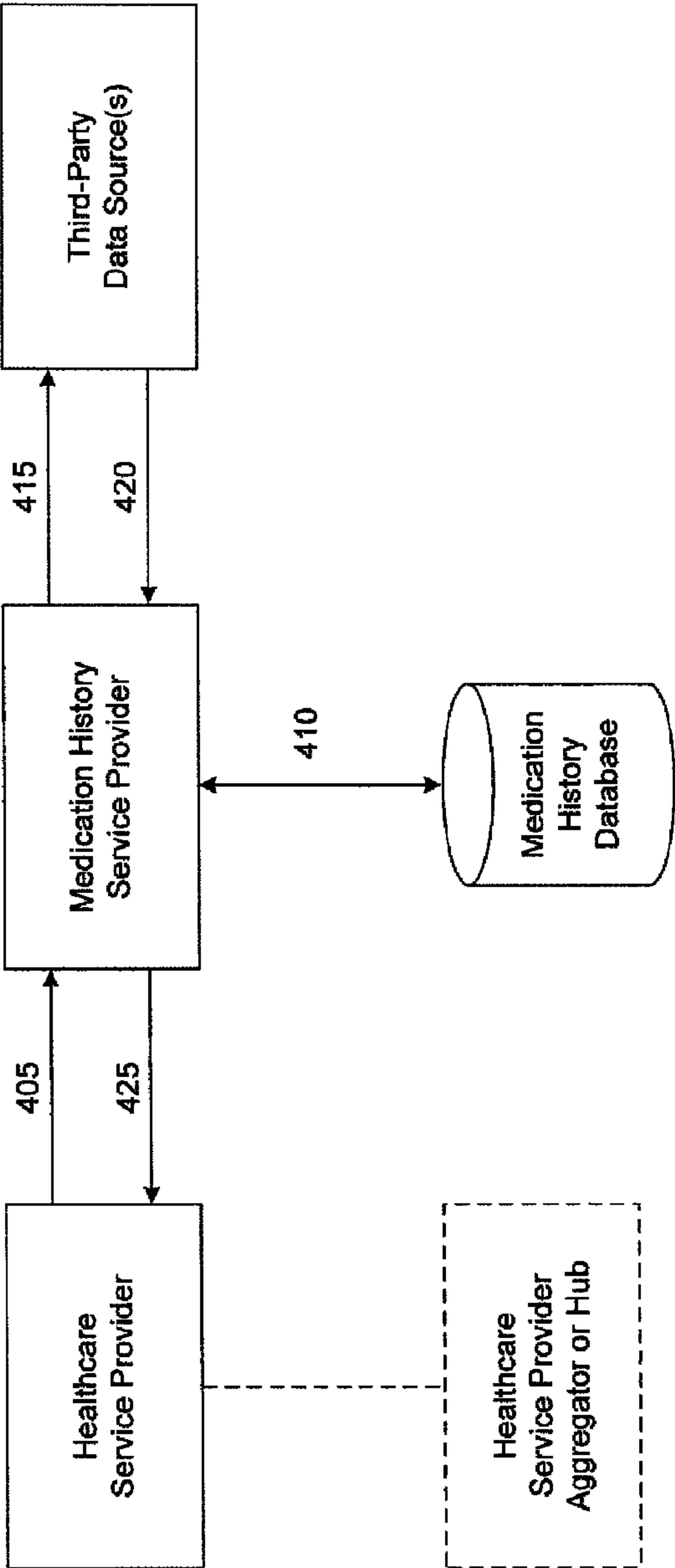


FIG. 4

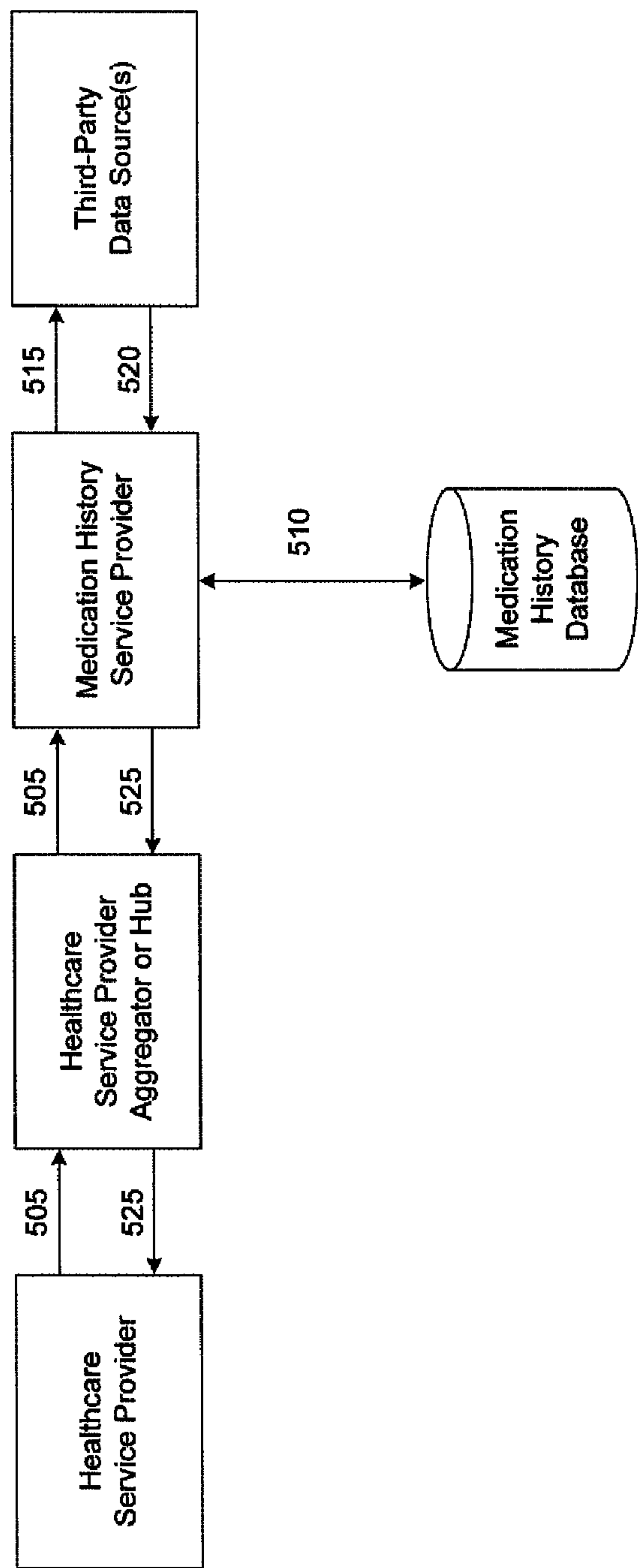
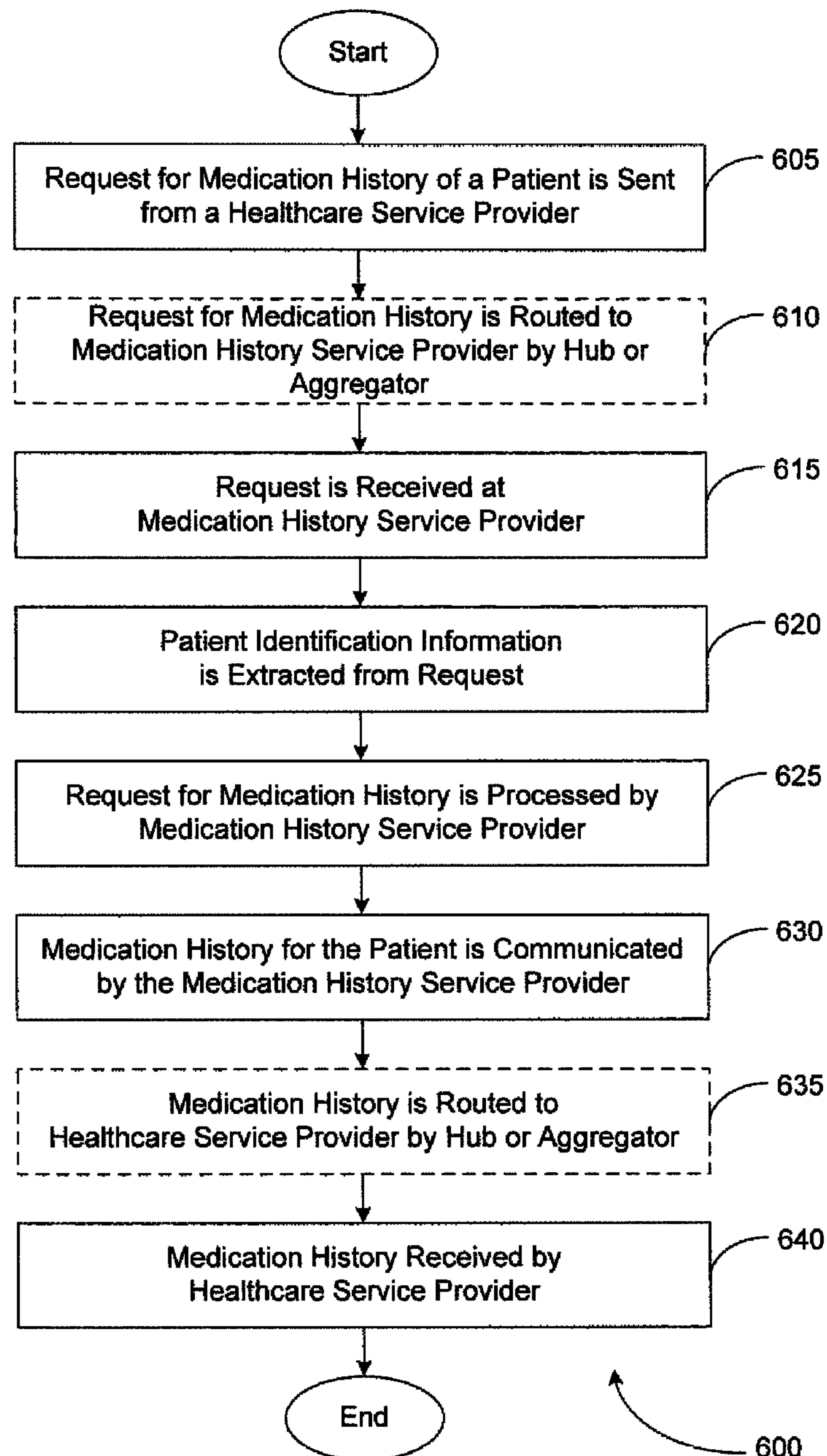
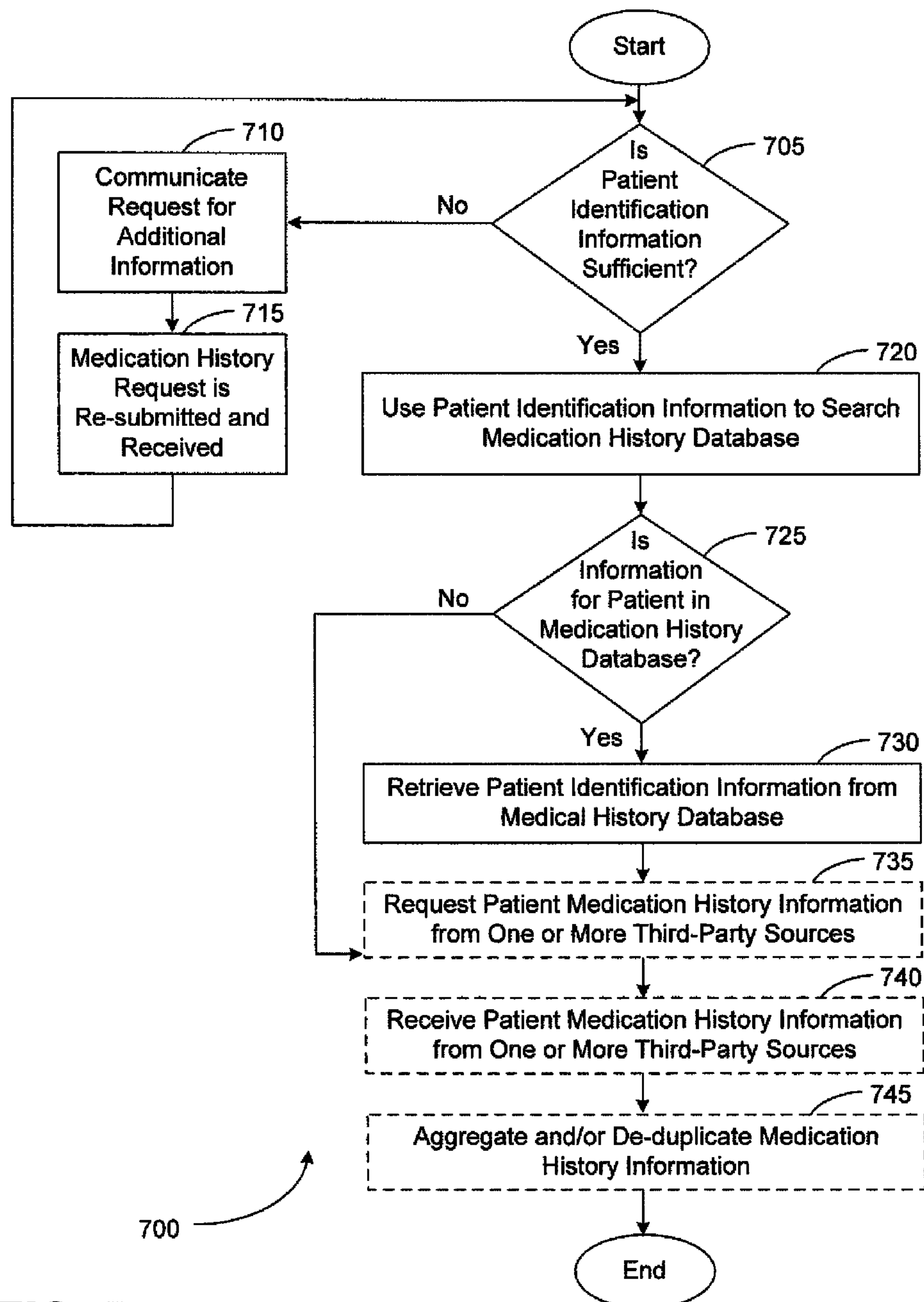
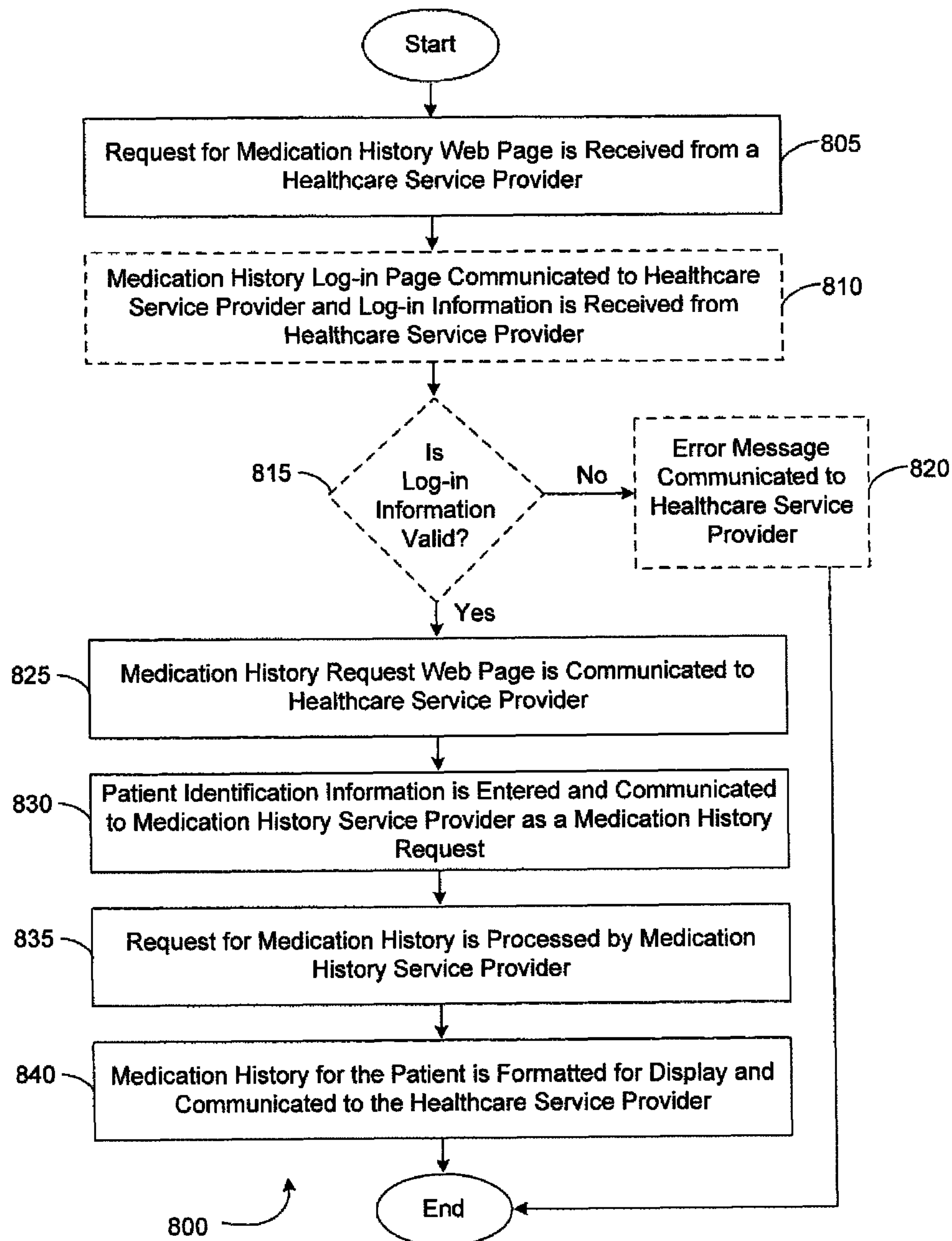


FIG. 5



**FIG. 6**

**FIG. 7**

**FIG. 8**

RelayHealth

Medication History

REQUEST HISTORYRESPONSE SEARCHREPORTSADMINISTRATIONHELPLOGOUT

HOME | REQUEST HISTORY

YOU ARE LOGGED IN AS salesdemo\sales.demo

12345678910Add Request

Request Medication History

Show/Hide Request(s):☒1

Request 1

First Name: \*

Last Name: \*

Cardholder Id:

Patient Consent: \*

Date of Birth: \*

Gender: \*

Zip Code: \*

Days of History: \*

905

915

920

Submit

Reset

Terms of Use

By submitting this request, User represents and warrants that: (a) he/she has obtained all consents necessary to make this request and receive this response in accordance with all applicable laws and regulations, and (b) is an authorized employee or agent of a healthcare provider permitted to make this request and receive this response.

FIG. 9



RelayHealth

Medication History

REQUEST HISTORYRESPONSE SEARCHREPORTSADMINISTRATIONHELPLOGOUT

HOME | REQUEST HISTORY

YOU ARE LOGGED IN AS salesdemo@sales.demo

Request Medication History

Request 1

First Name: \*  
Last Name: \*  
Cardholder Id: \*

Granted by Patient  
Date of Birth: \*  
Gender: \*  
Zip Code: \*  
Days of History: \*

12345-6789  
120  
120

01/16/1972  
Female  
120

\*\* Required Field

1005

Request Result

Patient Name

Submit Time

Status

User Id

User Name

doe, jane

04/15/2008 – 13:45:00

History Found

Bob.Smith

Bob Smith

Details ...

1000

Terms of Use

By submitting this request, User represents and warrants that: (a) he/she has obtained all consents necessary to make this request and receive this response in accordance with all applicable laws and regulations, and (b) is an authorized employee or agent of a healthcare provider permitted to make this request and receive this response.

FIG. 10

RelayHealth

Medication History

REQUEST HISTORYRESPONSE SEARCHREPORTSADMINISTRATIONHELPLOGOUT

HOME | REQUEST HISTORY

YOU ARE LOGGED IN AS salesdemo@sales.demo

Prescription Detail

Format: PDF Format | Export | Print

1120

1115

Return to Request Result

Sort by: Drug by Date

1105

Patient Name: jane doe

Date of Birth: 01/16/1972

Gender: Female

Date Submitted: 04/15/2008

Zip: 303403838

Cardholder Id:

Prescription Label

SKELAXIN Tablet 800 mg

Quantity

30

Fill Date

Days Supply

Refill #

2

Pharmacy

Druglix

333 SR 566

Providence, RI

02903

4015633390

1110

Associated Physician

Physician ID

Name

6641528925001

Majella, Robert

Address

Allscripts Lane

City

Libertyville

State

IL

Zip code

60048

Phone

8478889999

1100

FIG. 11

RelayHealth

Medication History

REQUEST HISTORYRESPONSE SEARCHREPORTSADMINISTRATIONHELPLOGOUT

HOME | REQUEST HISTORY

YOU ARE LOGGED IN AS salesdemo\sales.demo

Request Medication HistoryShow/Hide Request(s):☒1☒2☐3☐4☐5☐6☐7☐8☐9☐10Add Request2

Request 1

First Name:jane

Last Name:doe

Cardholder Id:

Patient Consent:Granted by Patient

Date of Birth:01/16/1972

Gender:Female

Zip Code:123456789

Days of History:120

\* - Required Field

Request 2

First Name:John

Last Name:doe

Cardholder Id:

Patient Consent:Granted by Patient

Date of Birth:05/28/1957

Gender:Male

Zip Code:987654321

Days of History:-- Select

\* - Required Field

SubmitReset

Terms of Use

By submitting this request, User represents and warrants that: (a) he/she has obtained all consents necessary to make this request and receive this response in accordance with all applicable laws and regulations, and (b) is an authorized employee or agent of a healthcare provider permitted to make this request and receive this response.

FIG. 12

RelayHealth

Medication History

REQUEST HISTORYRESPONSE SEARCHREPORTSADMINISTRATIONHELPLOGOUT

HOME | RESPONSE SEARCH

YOU ARE LOGGED IN AS salesdemo\sales.demo

Response Search

By Patient

First Name:

Last Name:

Cardholder Id:

Date of Birth:

Gender:

- Select -

Zip Code:

By User

User Id:

First Name:

Last Name:

Hospital Id:

salesdemo

Department:

By Date

Start Date:

03/23/2008

End Date:

04/22/2008

Time:

00:00:00

Time:

23:59:59

By Status

History Found

No History Found

Need More Data

Resubmission Required

Pending

Complete

Submit

Reset

\* - Required Field

1300

FIG. 13



RelayHealth				Medication History			
REQUEST HISTORY	RESPONSE SEARCH	REPORTS	ADMINISTRATION	<a href="#">HELP</a>	<a href="#">LOGOUT</a>		

[HOME](#) | RESPONSE SEARCH      YOU ARE LOGGED IN AS salesdemo\sales.demo

Response Search      
 ☒ Search Criteria    
 ☐ View Results    
 ☐ Result Detail    
 Rows Per Page: 12 ▼

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14 Medication History Record(s) found. The data is sorted by Submit Time in Descending order.

Patient Name	Submit Time	Status	User Id	User Name	
1 2					
doe, john	04/15/2008 - 21:48:47	History Found	John Patient	John Patient	<a href="#">Details ...</a>
doe, jane	04/15/2008 - 21:48:47	History Found	John Patient	John Patient	<a href="#">Details ...</a>
doe, jane	04/15/2008 - 15:26:53	History Found	John Patient	John Patient	<a href="#">Details ...</a>
doe, john	04/15/2008 - 15:26:53	History Found	John Patient	John Patient	<a href="#">Details ...</a>
doe, john	04/15/2008 - 15:03:55	History Found	John Patient	John Patient	<a href="#">Details ...</a>
doe, john	04/15/2008 - 14:47:51	History Found	John Patient	John Patient	<a href="#">Details ...</a>
doe, john	04/15/2008 - 14:42:14	Resubmission Required	John Patient	John Patient	<a href="#">Resubmit</a>
doe, john	04/15/2008 - 14:41:05	Resubmission Required	John Patient	John Patient	<a href="#">Resubmit</a>
patient, joe	04/15/2008 - 14:38:50	Resubmission Required	John Patient	John Patient	<a href="#">Resubmit</a>
patient, joe	04/15/2008 - 14:31:12	Resubmission Required	John Patient	John Patient	<a href="#">Resubmit</a>
doe, john	04/15/2008 - 13:52:47	Resubmission Required	John Patient	John Patient	<a href="#">Resubmit</a>
doe, john	04/15/2008 - 13:51:42	Resubmission Required	John Patient	John Patient	<a href="#">Resubmit</a>

**FIG. 14**

1400

## 1

**SYSTEMS AND METHODS FOR PROVIDING  
PATIENT MEDICATION HISTORY**

## FIELD OF THE INVENTION

Aspects of the invention relate generally to medication history, and more particularly, to systems and methods for providing patient medication history to healthcare service providers.

## BACKGROUND OF THE INVENTION

Healthcare service providers, such as, hospitals, doctor offices, etc., often collect information associated with the medication history of their patients. Such information is utilized in the diagnosis of a patient's medical condition and in determining the most appropriate courses of actions for treatment of the patient. Additionally, in the case of hospitals, the collection of medication history for a patient is often required in order to satisfy standards established by the Joint Commission of Accreditation of Healthcare Organizations (JCAHO).

Conventionally, patients self-report their medication history to healthcare service providers. Self-reporting is typically accomplished via in-take forms and/or a manual interview process conducted by employees of a healthcare service provider. Self-reporting may lead to inaccuracies in constructing a medication history for a patient as the patient may incorrectly report and/or omit one or more medications that he/she is currently taking or has taken in the past. These inaccuracies may lead to improper diagnosis of a patient's medical condition and/or to improper treatment of the patient. Accordingly, there is a need in the industry for systems and methods for capturing and providing patient medication history.

## SUMMARY OF THE INVENTION

Example embodiments of the invention may provide for systems and methods for capturing patient medication history and providing the patient medication history to a healthcare service provider, such as, a hospital, doctor's office, clinician, etc.

According to an example embodiment of the invention, there is a method for providing medication history information for a patient. A request for medication history information of a patient may be received, and the request may include identification information for the patient. At least one memory may be accessed utilizing at least a portion of the identification information. The at least one memory may include information associated with pharmacy claims transactions that is stored in the at least one memory in near real time as the pharmacy claims transactions are processed. Information associated with the medication history of the patient may be obtained from the at least one memory and the medication history information may be communicated in response to the received request.

According to another example embodiment of the invention, there may be a system for providing medication history information. The system may include at least a medication history database and a medication history service provider. The medication history database may include information associated with pharmacy claims transactions, wherein the information associated with the pharmacy claims transactions is stored in the medication history database in near real time as the pharmacy claims transactions are processed by a switch provider that interconnects pharmacies and adjudicators of the pharmacy claims transactions. The medication

## 2

history service provider may be operable to receive a request from a healthcare service provider for a medication history of a patient of the healthcare service provider, the request including identification information for the patient. The medication history service provider may further be operable to access the medication history database utilizing at least a portion of the identification information and to obtain information associated with the medication history of the patient from the medication history database. The medication history service provider may communicate the medication history information in response to the received request.

According to yet another example embodiment of the invention, there may be a method for providing patient medication history information. A plurality of pharmacy claims transactions may be switched between one or more pharmacies and one or more claims transactions adjudicators. Information associated with the plurality of switched pharmacy claims transactions may be stored in near real time as the pharmacy claims transactions are switched. A request for medication history information of a patient may be received, the request including identification information for the patient. At least a portion of the identification information may be utilized to access the stored information associated with the plurality of switched pharmacy claims transactions. At least a portion of the stored information may be communicated in response to the received request.

Other embodiments, aspects, features, and advantages of the invention will become apparent to those skilled in the art from the following detailed description, the accompanying drawings, and the appended claims.

## BRIEF DESCRIPTION OF THE DRAWINGS

Reference will now be made to the accompanying drawings, which are not necessarily drawn to scale, and wherein: FIG. 1 shows a block diagram of a system for dynamically capturing, and providing, patient medication history, according to an example embodiment of the invention.

FIG. 2 illustrates an example block diagram for capturing pharmacy claims, according to an example embodiment of the invention.

FIG. 3 illustrates an example flow diagram of a method for capturing pharmacy claims, according to an example embodiment of the invention.

FIG. 4 illustrates an example block diagram for providing patient medication history, according to an example embodiment of the invention.

FIG. 5 illustrates an example block diagram for providing patient medication history, according to another example embodiment of the invention.

FIG. 6 illustrates an example flow diagram of a method for providing patient medication history, according to an example embodiment of the invention.

FIG. 7 illustrates an example flow diagram of a method for accessing and/or obtaining patient medication history information, according to an example embodiment of the invention.

FIG. 8 illustrates an example flow diagram of a method for providing patient medication history, according to another example embodiment of the invention.

FIG. 9 illustrates an example web page that facilitates the receipt of patient medication history requests, according to an example embodiment of the invention.

FIG. 10 illustrates an example web page for displaying the results of a patient medication history request, according to an example embodiment of the invention.



3

FIG. 11 illustrates an example web page for displaying detailed medication history information for a patient, according to an example embodiment of the invention.

FIG. 12 illustrates another example web page for receiving patient medication history requests, according to an example embodiment of the invention.

FIG. 13 illustrates an example web page for sorting patient medication history information, according to an example embodiment of the invention.

FIG. 14 illustrates an example web page for displaying the results of a sort of patient medication history, according to an example embodiment of the invention.

#### DETAILED DESCRIPTION

Example embodiments of invention now will be described more fully hereinafter with reference to the accompanying drawings, in which embodiments of the invention are shown. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art. Like numbers refer to like elements throughout.

The invention is described below with reference to block diagrams and flowchart illustrations of systems, methods, apparatuses and computer program products according to embodiments of the invention. It will be understood that each block of the block diagrams and flowchart illustrations, and combinations of blocks in the block diagrams and flowchart illustrations, respectively, can be implemented by computer program instructions. These computer program instructions may be loaded onto a general purpose computer, special purpose computer such as a switch, or other programmable data processing apparatus to produce a machine, such that the instructions which execute on the computer or other programmable data processing apparatus create means for implementing the functions specified in the flowchart block or blocks.

These computer program instructions may also be stored in a computer-readable memory that can direct a computer or other programmable data processing apparatus to function in a particular manner, such that the instructions stored in the computer-readable memory produce an article of manufacture including instruction means that implement the function specified in the flowchart block or blocks. The computer program instructions may also be loaded onto a computer or other programmable data processing apparatus to cause a series of operational elements or steps to be performed on the computer or other programmable apparatus to produce a computer implemented process such that the instructions that execute on the computer or other programmable apparatus provide elements or steps for implementing the functions specified in the flowchart block or blocks.

Accordingly, blocks of the block diagrams and flowchart illustrations support combinations of means for performing the specified functions, combinations of elements or steps for performing the specified functions and program instruction means for performing the specified functions. It will also be understood that each block of the block diagrams and flowchart illustrations, and combinations of blocks in the block diagrams and flowchart illustrations, can be implemented by special purpose hardware-based computer systems that perform the specified functions, elements or steps, or combinations of special purpose hardware and computer instructions.

The terms “patient medication history,” “medication history,” “prescription history,” and “patient prescription his-

4

tory,” are used interchangeably throughout the description, and should be construed to cover the history of any prescription drugs, medications, medical treatments, and/or medical devices that may be obtained at a pharmacy, doctor’s office, hospital or similar location using a prescription.

In accordance with example embodiments of the invention, a healthcare service provider, such as, a hospital, doctor’s office, clinician, etc., may be provided with patient medication history. The patient medication history may be provided in response to a request received from the healthcare service provider, wherein the request includes patient identification information. The patient medication history may be provided to the healthcare service provider by a medication history service provider that retrieves the medication history from one or more medication history databases. Patient medication history information may be stored in the one or more medication history databases during the processing of pharmacy claims transactions. Additionally, the medication history service provider may retrieve medication history information from one or more third party data sources.

An example system in accordance with an embodiment of the invention is shown in FIG. 1, which shows a block diagram of a system 100 for dynamically capturing, and providing, patient medication history. In particular, the system 100 of FIG. 1 may include at least one pharmacy 102, at least one switch provider 104, at least one third-party processing system 106, at least one healthcare service provider 108, and at least one medication history service provider 110, which are each configured for accessing and reading associated computer-readable media having stored thereon data and/or computer-executable instructions for implementing the various methods of the invention. Additionally, certain embodiments of the invention may include at least one healthcare service provider hub or aggregator 112 and/or at least one third party data source 114. Generally, network devices and systems, including the one or more pharmacies 102, switch providers 104, third-party processing systems 106, medication history service providers 108, healthcare service provider hubs 112 and third party data sources 114 may have hardware and/or software for transmitting and receiving data and/or computer-executable instructions over a communications link and a memory for storing data and/or computer-executable instructions. These network devices and systems may also include a processor for processing data and executing computer-executable instructions, as well as other internal and peripheral components that are well known in the art. As used herein, the term “computer-readable medium” describes any form of memory or a propagated signal transmission medium. Propagated signals representing data and computer-executable instructions are transferred between network devices and systems.

As shown in FIG. 1, a pharmacy 102, switch provider 104, third-party processing system 106, and medication history service provider 110 may be in communication with each other via a network 115, which as described below can include one or more private and public networks, including the Internet. Each component of the system 100 may be in direct communication with one or more other components of the system 100 as desired in various embodiments of the invention. Additionally, in certain embodiments, a healthcare service provider hub 112 and/or one or more third party data sources 114 may be in communication with one or more other components of the system 100 via the network 115. Each of these components—the pharmacy 102, the switch provider 104, the third-party processing system 106, the healthcare service provider 112, the third party data sources 114, and the network 115—will now be discussed in turn.



## 5

First, the pharmacy 102 may be any processor-driven device, such as a personal computer, laptop computer, handheld computer, and the like. In addition to having a processor 120, the pharmacy 102 may further include a memory 121, input/output (“I/O”) interface(s) 122 and a network interface 123. The memory 121 may store data files 124 and various program modules, such as an operating system (“OS”) 125 and a client module 126. The client module 126 may be an Internet browser or other software, including a dedicated program, for interacting with the switch provider 104. For example, a user 128, such as a consumer, pharmacist, or other pharmacy employee, may utilize the client module 126 in preparing and providing prescription claims transaction requests, such as, prescription drug requests or orders, to the switch provider 104 for processing. The pharmacy 102 may also utilize the client module 126 to retrieve or otherwise receive data from the switch provider 104, including indications that one or more prescription claims transaction requests have been communicated to, received by, processed by, and or approved by a third-party processing system 106.

Still referring to the pharmacy 102, the I/O interface(s) 122 may facilitate communication between the processor 120 and various I/O devices, such as a keyboard, mouse, printer, microphone, speaker, monitor, bar code readers/scanners, RFID readers, and the like. The network interface 123 may take any of a number of forms, such as a network interface card, a modem, a wireless network card, and the like. These and other components of the pharmacy 102 will be apparent to those of ordinary skill in the art and are therefore not discussed in more detail herein. Additionally, the pharmacy 102 may be associated with any entity that fills or fulfills prescription requests for a patient, such as, a pharmacy, hospital pharmacy, etc.

The switch provider 104 may include any processor-driven device that is configured for receiving, processing, and/or fulfilling requests received from the pharmacy 102 related to pharmacy, benefits, prescription and/or medical claims transactions. For example, the switch provider 104 may include a claims transactions switch or network operated by RelayHealth™. The switch provider 104 may therefore include a processor 130, a memory 131, input/output (“I/O”) interface(s) 132, and a network interface 133. The memory 131 may store data files 134 and various program modules, such as an operating system (“OS”) 135, a database management system (“DBMS”) 136, and a host module 137. The host module 137 may receive, process, and respond to requests from the respective client module 126 of the pharmacy 102, and may further receive, process, and respond to requests and/or communications from the respective host modules 146 of the third-party processing system 106. For example, the host module 137 may receive a prescription claims transaction request from a pharmacy 102, and the switch provider 104 may process the request and communicate the request to a third-party processing system 106 for adjudication. Following the adjudication of the claim by the third-party processing system 106, the switch provider 104 may receive an indication of either a successful or unsuccessful adjudication from the third-party processing system 106, and the switch provider 104 may communicate the indication to the pharmacy 102. Additionally, the switch provider 104 may store information associated with requested and/or adjudicated prescription claims transactions in one or more suitable memory devices and/or data repositories, such as, a medication history database 138.

According to an aspect of the invention, one or more suitable memory devices, such as, medication history database 138, may be associated with the switch provider 104. The

## 6

switch provider 104 may store information associated with pharmacy claims transactions in the medication history database 138. A wide variety of different information may be stored in the medication history database 138 as desired in various embodiments of the invention. Information that may be stored includes, but is not limited to, identification information for a patient that is filling a subscription or obtaining prescribed medical equipment at the pharmacy 102 (e.g., name, address, zip code, date of birth, gender, etc.), insurance information associated with the patient (e.g., primary insurance provider, secondary insurance provider, insurance account numbers, co-pay amount, etc.), information associated with the prescribed drugs and/or medical equipment (e.g., an identification of the drug such as a National Drug Code (NDS), drug name, drug manufacturer, prescription amount, expiration date, price of the drug, etc.), information associated with the payment method utilized by the patient (e.g., cash, credit, check, etc.), information associated with the pharmacy 102 (e.g., name of pharmacy, pharmacy identification number, address of pharmacy, name of pharmacists, etc.), the date and time of the claims transaction request, information associated with the third-party processing system 106 (e.g., a Banking Identification (BIN)/Processor Control Number (PCN) for identifying a third-party processing system 106 as a destination of a claim request, a name of the third-party processing system, etc.), and/or information associated with the adjudication of the claim by a third-party service provider 106 (e.g., status of the claim adjudication, whether the claim was paid, amount paid, date paid, etc.). Additionally, the medication history database 138 may be utilized to store information associated with a wide variety of different types of pharmacy claims transactions, including but not limited to, insurance claims transactions, credit card transactions, check transactions, and/or cash transactions.

The third-party processing system 106 may include any processor-driven device that is configured for receiving, processing, and fulfilling requests from the pharmacy 102 or switch provider 104 related to pharmacy, benefits, prescription and/or medical claims transactions. The third-party processing system 106 may include a processor 140, a memory 141, input/output (“I/O”) interface(s) 142, and a network interface 143. The memory 141 may store data files 144 and various program modules, such as an operating system (“OS”) 145, a database management system (“DBMS”) 146, and a host module 147. The host module 147 receives, processes, and responds to requests from the client module 126 of pharmacy 102, and further receives, processes, and responds to requests from the host module 137 of the switch provider 104. Those of ordinary skill in the art will appreciate that the third-party processing system 106 may include alternate and/or additional components, hardware or software. Additionally, the third-party processing system 106 may be associated with a payer of pharmacy benefits, such as, an insurance carrier, a health plan provider, a pharmacy benefits manager (PBM), a large employer group, etc.

According to an aspect of the invention, information associated with pharmacy claims transactions that are routed through the switch provider 104 is stored in the medication history database 138. The information may be stored at a wide variety of different times as desired in various embodiments of the invention. According to one embodiment of the invention, information associated with the transaction may be stored in a local memory associated with the switch provider 104 (e.g., a cache, a random access memory (RAM), etc.) as it is routed to the third-party processing system 106. The information may then be written to the medication history database 138 from the local memory. Information may be



written from the local memory to the medication history database **138** at predetermined time intervals as desired in various embodiments of the invention, such as, once every minute, one every 15 minutes, once every hour, once every 2 hours, etc.). Alternatively, the information may be written to the medication history database **138** during the routing of the transaction to the third-party processing system **106**. If the information is written to the medication history database **138** during the routing of a transaction or if the predetermined time interval for updating the medication history database **138** from local memory is relatively small, then the medication history database **138** may be updated regularly in near real time as claims transactions are processed by the switch provider **104**.

In addition to processing and storing claims transaction requests received from a pharmacy **102** and routed to a third-party processing system **106**, the switch provider **104** may also store information received from a third-party processing system **106** in the medication history database **138**, such as, information associated with the adjudication of a pharmacy claim transaction. The switch provider **104** may store information received from a third-party processing system in a similar manner as that described above for storing information received from a pharmacy **102**. In this regard, medication history information associated with patients may be stored. Medication history information may be stored for any number of patients whose pharmacy claims transactions are routed through the switch provider **104**.

The healthcare service provider **108** may include any processor-driven device that is configured for requesting and receiving medication history information associated with a patient of the healthcare service provider **108**. The healthcare service provider may include a processor **150**, a memory **151**, input/output (“I/O”) interface(s) **152**, and a network interface **153**. The memory **151** may store data files **154** and various program modules, such as an operating system (“OS”) **155**, and a client module **156**. The client module **156** may communicate one or more requests for patient medication history information, and the client module may receive patient medication history information in response to the requests. As described in greater detail below, the client module **156** may communicate requests directly to the medication history service provider **110** or the requests may be communicated through one or more other entities, such as, a healthcare service provider hub or aggregator **112**. In certain embodiments of the invention, the client module **156** may be an Internet browser or other software, including a dedicated program, for interacting with the switch provider **104**. In other embodiments of the invention, the client module **156** may be a software program that communicates transaction information containing patient identification information. The transaction information may be communicated directly to the medication history service provider **110** or, alternatively, to a healthcare service provider aggregator **112**. The patient identification information may be extracted and utilized to identify medication history information associated with the patient. The patient identification information may be extracted by the medication history service provider **110** or by the healthcare service provider aggregator **112**. If the healthcare service provider aggregator **112** extracts the patient identification information, then the healthcare service provider aggregator **112** may communicate a request for patient medication history information to the medication history service provider **110** on behalf of the healthcare service provider **108**.

Still referring to the healthcare service provider **108**, the I/O interface(s) **152** may facilitate communication between

the processor **150** and various I/O devices, such as a keyboard, mouse, printer, microphone, speaker, monitor, bar code readers/scanners, RFID readers, and the like. In this regard, the I/O interface(s) may facilitate the collection of patient identification information that is utilized in patient medication history requests. The network interface **153** may take any of a number of forms, such as a network interface card, a modem, a wireless network card, and the like. These and other components of the healthcare service provider **108** will be apparent to those of ordinary skill in the art and are therefore not discussed in more detail herein.

Additionally, the healthcare service provider **108** may be associated with any healthcare service entity that desires patient medication history for diagnosis and/or treatment purposes, such as, a hospital, a doctor’s office, a client, etc. Patient identification information may be gathered at the healthcare service provider **108** and used in the generation of a request for patient medication history information. For example, a hospital employee may utilize one or more I/O devices and the client module **156** to input patient identification information for the generation of a request for medication history information for the patient. The request may be communicated either directly or indirectly to the medication history service provider **110** and patient medication history information may be communicated to the healthcare service provider **108**.

The medication history service provider **110** may include any processor-driven device that is configured for receiving and processing requests for patient medication history. For example, the medication history service provider **110** may include a medication history service provider **110** operated by RelayHealth™. The medication history service provider **110** may therefore include a processor **160**, a memory **161**, input/output (“I/O”) interface(s) **162**, and a network interface **163**. The memory **161** may store data files **164** and various program modules, such as an operating system (“OS”) **165**, a database management system (“DBMS”) **166**, and a host module **167**. The host module **167** may receive, process, and respond to requests for patient medication history. During the processing of requests, the medication history service provider **110** may access the medication history database **138** and one or more third party data sources **114** in order to gather patient medication history information, as explained in greater detail below.

Patient medication history requests may be received from the respective client module **156** of the healthcare service provider **108** either directly or via one or more other components of the system **100**, such as, via a healthcare service provider hub **112**. A request for patient medication history may include identification information for one or more patients. The medication history service provider **110** may utilize at least a portion of the identification information to search the medication history database **138**. Additionally, in certain embodiments of the invention, the medication history service provider **110** may utilize at least a portion of the identification information to communicate requests for patient medication history information to one or more third party data sources **114**. Patient medication history information may be received from the one or more third party data sources **114** in response to the requests. Additionally, patient medication history information received from one or more third party data sources **114** may be combined or aggregated with patient medication history information retrieved from the medication history database **138**.

Although the medication history service provider **110** is illustrated in FIG. 1 as a separate component of the system



100, the medication history service provider 110 may be combined with the switch provider 104 in certain embodiments of the invention.

The healthcare service provider hub or aggregator 112 may include any processor-driven device that is configured for routing patient medication history requests from a healthcare service provider 108 to the medication history service provider 110. For example, the healthcare service provider hub or aggregator may be a hospital aggregator that provides transactions processing and/or other services to one or more hospitals or other healthcare service providers. As another example, the healthcare service provider hub or aggregator may be a hospital vendor that provides software and/or services to one or more hospitals or other healthcare service providers.

The healthcare service provider hub may include a processor 170, a memory 171, input/output (“I/O”) interface(s) 172, and a network interface 173. The memory 171 may store data files 174 and various program modules, such as an operating system (“OS”) 175, a DBMS 176, a host module 177, and a client module 178. The host module 177 may receive requests for patient medication history information from the client module 156 of the healthcare service provider 108, and the client host module 177 may process the requests. The client module 178 may transmit requests received from the healthcare service provider 108 to the host module 167 of the medication history service provider 110. In this regard, healthcare service provider requests for patient medication history may be routed to the medication history service provider 110 by the healthcare service provider hub 112.

The third party data source(s) 114 may include any number of processor-driven devices that are configured to receive and process requests for patient medication history information. In one embodiment of the invention, each of the third party data sources 114 may receive requests for patient medication history information from the medication history service provider 110, and each of the third party data sources may process the requests and communicate patient medication history information to the medication history service provider 110. Additionally, in various embodiments of the invention, requests may be received from other components of the system 100 and processed by the third party data source(s) 114.

A wide variety of different entities may function as third party data source(s) 114, such as, prescription benefit managers, pharmacy benefit managers, insurance companies, healthcare coverage companies, etc. For example, Caremark™, ESI™, and Netco™ may be prescription benefit managers that function as third party data sources 114. As another example, various Blue Cross Blue Shield Association™ companies and/or other healthcare coverage companies may function as third party data sources.

Each of the third party data sources 114 may include a processor 180, a memory 181, input/output (“I/O”) interface(s) 182, and a network interface 183. The memory 181 may store data files 184 and various program modules, such as an operating system (“OS”) 185, a DBMS 186, and a host module 187. The host module 187 may receive and process requests for patient medication history information. Each of the third party data sources 114 may utilize information included in a request, such as, patient identification information, to access one or more suitable memory devices and/or data repositories, such as, an associated medication history database 190. Patient medication history information may then be communicated to a requesting entity by a third party data source 114. In one embodiment, requests for patient medication history information may be received from the medication history service provider 110. In this regard, the

medication history service provider 110 may supplement any information retrieved from the medication history database 138 associated with the medication history service provider 110. Requests for medication history information may be communicated from the medication history service provider 110 to the various third party data sources 114 during the processing of a request received from a healthcare service provider 108 or, alternatively, at predetermined time intervals, such as, once an hour, once a day, etc.

The medication history databases 190 associated with the various third party data sources 114 may include information associated with pharmacy claims transactions, pharmacy cash transactions, and/or other pharmacy transactions. The pharmacy claims transaction may be transactions that are processed by the third party data sources 114, switched or routed through the third party data sources 114, and/or adjudicated by the third party data sources 114.

The network 115 may include any telecommunication and/or data network, whether public, private, or a combination thereof, including a local area network, a wide area network, an intranet, an internet, the Internet, intermediate hand-held data transfer devices, and/or any combination thereof and may be wired and/or wireless. The network 115 may also allow for real-time, off-line, and/or batch transactions to be communicated or transmitted between various components of the system 100, such as, between the pharmacy 102 and the switch provider 104. Due to network connectivity, various methodologies as described herein may be practiced in the context of distributed computing environments. For example, although the pharmacy 102 is shown for simplicity as being in communication with the switch provider 104 via one intervening network 115, it is to be understood that any other network configuration is possible. For example, intervening network 115 may include a plurality of networks, each with devices such as gateways and/or routers for providing connectivity between or among networks 115. Instead of or in addition to a network 115, dedicated communication links may be used to connect the various components or devices in accordance with example embodiments of the invention. For example, the switch provider 104 may form the basis of network 115 that interconnects the pharmacy 102 and the third-party processing system 108.

Those of ordinary skill in the art will appreciate that the system 100 shown in and described with respect to FIG. 1 is provided by way of example only. Numerous other operating environments, system architectures, and device configurations are possible. Accordingly, embodiments of the invention should not be construed as being limited to any particular operating environment, system architecture, or device configuration.

FIG. 2 illustrates an example block diagram for capturing pharmacy claims, according to an example embodiment of the invention. A pharmacy, such as pharmacy 102 shown in FIG. 1, may transmit a claim request 205 on behalf of a customer to a switch provider, such as switch provider 104 shown in FIG. 1. The claim request 205 may include a wide variety of different information associated with a pharmacy claim as desired in various embodiments of the invention. The switch provider 104 may receive the claim request 205 and route the claim request 205 to an appropriate third-party processing system, such as third-party processing system 106, for further processing and/or adjudication. According to an example embodiment, the switch provider 104 may utilize a BIN/PCN in the received claim request 205 to determine the appropriate third-party processing system 106 to route the claim request 205 to. The switch provider 104 may also include a routing table, perhaps stored in memory, such as



## 11

memory 131, for determining which third-party payor 106 to route the claim request 205 to. According to an example embodiment of the invention, the third-party processing system 106 may be any pharmacy claims processing system such as a pharmacy benefits manager (e.g., a pharmacy benefits manager (PBM)), an insurance company, or a government payor (e.g., Medicare, Medicaid). Alternatively, the third-party processing system 106 may be a discount program processing system, including a discount program where a customer is responsible for paying for a portion or entire cost of the drug.

The third-party processing system 106 may receive and adjudicate the claim request 205. In particular, the third-party processing system 106 may determine benefits coverage for the received claim request 205 according to an adjudication process associated with eligibility, pricing, and/or utilization review. According to an example embodiment of the invention, the adjudication process may include determining a covered amount such as an insured amount, as well as a customer amount such as a co-pay amount. The third-party processing system 106 may transmit an adjudicated claim 210 to the switch provider 104. If the drug is covered, at least in part, by the third-party processing system 106, then the adjudicated claim 210 may include the covered amount, and the customer amount. On the other hand, if the drug is not covered by the payor 106, then the adjudicated claim 210 may include a rejected claim notice indicating that the drug is not covered by the third-party processing system 106. The adjudicated claim 210 may also include some or all of the information included in the claim request 205, discussed herein. The switch provider 104 receives the adjudicated claim 210 from the third-party processing system 106 and then routes the adjudicated claim 210 back to the pharmacy 102. At the pharmacy 102, the patient will then be responsible for any customer amount (e.g., co-pay amount) indicated by the adjudicated claim 210.

In addition to routing the claim request 205 and the adjudicated claim 210, the switch provider 104 may also capture and/or store information associated with the claim request 205 and/or the adjudicated claim. The information may be stored in one or more records 215 in a suitable memory device or data repository associated with the switch provider 104, such as, in medication history database 138 shown in FIG. 1. In various embodiments of the invention, any number of records 215 may be stored in the medication history database 138. Additionally, each record 215 may include a wide variety of information as desired in various embodiments of the invention, including but not limited to, the information discussed above with reference to FIG. 1. In this regard, information associated with pharmacy claims transactions may be stored by a switch provider 104 that routes the claims. In certain embodiments of the invention, the information may be stored in near real time or approximately in real time as the claims are routed by the switch provider 104.

FIG. 3 illustrates an example flow diagram of a method 300 for capturing pharmacy claims, according to an example embodiment of the invention. The method 300 may begin at block 305. At block 305, a pharmacy, such as pharmacy 102, may transmit a claim request, such as claim request 205, to a switch provider, such as switch provider 104. At block 310, which may be optional in some embodiments of the invention, the switch provider 104 may store information associated with the received claim request 205 in one or more suitable memories or data repositories, such as, medication history database 138. Information associated with the claim request 205 may be stored in the medication history database 138 in near real time or approximately in real time as the

## 12

claim request 205 is processed by the switch provider 104. Alternatively, information associated with the claim request 205 may be stored in one or more local memories (e.g., a cache or a random access memory) associated with the switch provider 104 during the processing of the claim request 205, and the information may later be written to the medication history database 138. The information may be written to the medication history database 138 from the one or more local memories in near real time, following the adjudication of the claim, and/or at a predetermined time interval, such as, once every minute, once every 15 minutes, once every hour, etc.

At block 315, the switch provider 104 may route the claim request 205 to a third-party processing system, such as third-party processing system 106, for adjudication. At block 320, the claim request 205 may be adjudicated by the third-party processing system 106 and an adjudicated claim, such as adjudicated claim 210, may be transmitted or otherwise communicated to the switch provider 104 by the third-party processing system 106.

At block 325, the switch provider 104 may store information associated with the claim request 205 and/or the adjudicated claim 210 in one or more suitable memories or data repositories, such as, medication history database 138. Information associated with the claim request 205 and/or the adjudicated claim 210 may be stored in the medication history database 138 in near real time or approximately in real time as the adjudicated claim 210 is processed by the switch provider 104. Alternatively, information associated with the claim request 205 and/or adjudicated claim 210 may be stored in one or more local memories (e.g., a cache or a random access memory) associated with the switch provider 104 during the processing of the claim request 205 and/or the adjudicated claim 210, and the information may later be written to the medication history database 138. The information may be written to the medication history database 138 from the one or more local memories in near real time, following the adjudication of the claim, and/or at a predetermined time interval, such as, once every minute, once every 15 minutes, once every hour, etc. In this regard, information associated with claim requests and/or adjudicated claims that are processed by the switch provider 104 may be stored in the medication history database 138 for subsequent retrieval in the processing of requests for patient medication history.

At block 330, the switch provider 104 may route the adjudicated claim 210 to the pharmacy 102. The method 300 may end following block 330.

The operations described in the method 300 of FIG. 3 do not necessarily have to be performed in the order set forth in FIG. 3, but instead may be performed in any suitable order. For example, in certain embodiments of the invention, the switch provider 104 may store information associated with a claim request 205 and/or an adjudicated claim 210 in the medication history database 138 following the routing of the adjudicated claim 210 to the pharmacy 102. Additionally, various operations described in the method 300 of FIG. 3 may be performed in a parallel manner. Additionally, in certain embodiments of the invention, more or less than all of the operations set forth in FIG. 3 may be performed.

FIG. 4 illustrates an example block diagram for providing patient medication history, according to an example embodiment of the invention. A healthcare service provider, such as healthcare service provider 108, may communicate a request 405 for patient medication history to a medication history service provider, such as medication history service provider 110. In some embodiments of the invention, the request 405 may be communicated directly to the medication history service provider 110 by the healthcare service provider 108. As



13

explained in greater detail below, the request **405** may be communicated to the medication history service provider **110** via a suitable web portal or other Internet based application. Alternatively, the request **405** may be communicated to the medication history service provider **110** by patient management software, prescription drug software, or other applications operated by the healthcare service provider **108**. For example, the request **405** may be communicated to the medication history service provider **110** by patient intake and/or management software utilized by the healthcare service provider. An appropriate transaction set, such as, a National Council for Prescription Drug Programs (NCPDP) transaction set, may be embedded in the software utilized by the healthcare service provider **108**, and the transaction set may facilitate the communication of the request **405**. The software may be provided to the healthcare service provider **108** by one or more vendors that operate as healthcare service provider aggregators or hubs, such as healthcare service provider hub **112**. Accordingly, in certain embodiments of the invention, the software may be branded as software of the one or more vendors. In such a situation, the software may operate to send the request **405** directly to the medication history service provider **110**. Alternatively, the software may send requests to the healthcare service provider hub **112** for routing to the medication history service provider **110**, as discussed in greater detail below with reference to FIG. 5.

The medication history service provider **110** may receive the request **405** and process the request **405** in order to obtain patient medication history information. The request **405** may include identification information for one or more patients, for example, names of the patients, zip codes of the patients, addresses of the patients, dates of birth for the patients, genders for the patients, insurance information for the patients, driver's license numbers of patients, social security numbers of patients, other identifying numbers for patients, information concerning whether the patients have consented to their medication history information being accessed, etc. The medication history service provider **110** may utilize at least a portion of the identification information to obtain patient medication history information from various sources, including from a medication history database, such as medication history database **138** and/or from one or more third party data sources, such as data sources **114**. Additionally, the request **405** may include one or more dates, times, ranges of dates, and/or ranges of times for which patient medication history is sought. These dates and/or times may be utilized to filter patient medication history information. For example, patient medication history may be requested for the previous month.

According to an aspect of the invention, the medication history service provider **110** may access the medication history database **138** to obtain stored patient medication history information **410**. In this regard, the medication history service provider **110** may obtain medication history information associated with pharmacy claims transactions that have been processed by an associated switch network, such as switch network **104**. In certain embodiments of the invention, claims transactions may be processed by the switch provider **104** and stored in the medication history database **138** in near real time. In this situation, the medication history service provider **110** may have access to the stored information about the processed claims transactions in near real time. Thus, the patient medication history information **410** obtained by the medication history service provider **110** may be relatively current and up-to-date. For example, an individual may have a prescription filled at a pharmacy in the morning, and the individual may be admitted to a hospital later that day. The hospital may request medication history information from the

14

medication history service provider **110**, and the medication history database **138** may be accessed in processing the request. Information obtained from the medication history database **138** may include information concerning the filling of the prescription earlier in the same day. Thus, when medication history information is communicated to the requesting hospital, the information may be relatively current and up-to-date.

According to another aspect of the invention, the medication history service provider **110** may obtain medication history information from one or more third party data sources **114**. In this regard, medication history information may be obtained for pharmacy claims transactions that are not processed by the switch provider **104**, for example, pharmacy claims transactions processed by a separate switch provider and/or mail order pharmacy claims. Additional information for pharmacy claims transactions that are processed by the switch provider **104** may also be obtained from the one or more third party data sources **114**. The medication history service provider **110** may communicate requests **415** for patient medication history information to one or more third party data sources **114**. The requests may obtain identification information for one or more patients. The one or more third party data sources **114** may process the requests and obtain patient medication history information. For example, the one or more third party data sources **114** may utilize at least a portion of the patient identification information to access one or more memories or data repositories, such as medication history databases **190**, in order to obtain stored medication history information. As another example, the one or more third party data sources **114** may send requests to additionally entities for the patient medication history information. Once patient medication history information is accessed and/or obtained by one or more third party data sources **114**, the one or more third party data sources **114** may communicate replies **420** to the medication history service provider **110** that include at least a portion of the accessed or obtained patient medication history information. Alternatively, if no patient medication history information is found or obtained by a third party data source **114**, a reply **420** may be communicated to the medication history service provider **110** indicating that no information was found.

A wide variety of different factors may be taken into consideration by a medication history service provider **110** in determining whether or not requests **415** for patient medication history information will be communicated to one or more third party data sources **114**. These factors include, but are not limited to, a determination as to whether information is found in the associated medication history database **138**, preferences of the requesting healthcare service provider **108**, preferences associated with a healthcare service provider hub or aggregator **112**, etc. For example, in certain embodiments of the invention, requests **415** may be communicated to one or more third party data sources **114** if it is determined that no patient medication history information is stored in the medication history database **138** associated with the medication history service provider **110** or that the stored information is incomplete. As another example, in certain embodiments, requests **415** may be communicated to one or more third party data sources **114** if the healthcare service provider **108** has indicated (either in prestored preferences or with a communicated request **405**) that third party data sources **114** should be accessed. For example, a healthcare service provider **108** may indicate that all available data sources should be accessed, that specified data sources should be accessed, and/or that a certain number of available data sources should be accessed. Data sources that are accessed may also be priori-



15

tized in accordance with a wide variety of different factors, such as, costs associated with accessing the data sources, response time of the data sources, the frequency that the data sources are updated, the accuracy of the data sources, etc.

Additionally, in some embodiments of the invention, requests may be communicated to a plurality of third party data sources **114** in parallel. The requests may also be communicated to the third party data sources **114** in parallel with accessing the medication history database **138** associated with the medication history service provider **110**. In some embodiments of the invention, requests may be communicated to the third party data sources **114** either before or after accessing the medication history database **138**. Additionally, in some embodiments of the invention, one or more requests may be communicated to different third party data sources **114** in a non-parallel manner, such as, in a sequential manner.

Information received from the one or more third party data sources **114** may be reconciled with and/or aggregated with that obtained from the medication history database **138**. Duplicative information may be deleted. Additionally, any information received from the one or more third party data sources **114** may be stored in the medication history database **138** and/or in one or more other data repositories associated with the medication history service provider **110**.

The medication history service provider **110** may communicate a response **425** to the healthcare service provider **108** after accessing the medication history database **138** and/or receiving responses **420** from the one or more data sources **114**. The response **425** communicated to the healthcare service provider **108** may contain a portion or all of the medication history information for the patient(s) that was obtained by the medication history service provider **108**. Alternatively, if no patient medication history information was obtained by the medication history service provider **110**, the response **425** may indicate that no patient medication history information was found.

FIG. **5** illustrates an example block diagram for providing patient medication history, according to another example embodiment of the invention. The diagram illustrated in FIG. **5** may be similar to that shown in FIG. **4** with the exception of further including a healthcare service provider aggregator or hub, such as hub **112**, that routes communications between a healthcare service provider, such as healthcare service provider **108**, and a medication history service provider, such as medication history service provider **110**.

With reference to FIG. **5**, a healthcare service provider **108** may communicate a request **505** for patient medication history to a healthcare service provider aggregator **112**, and the healthcare service provider aggregator **112** may route or otherwise communicate the request **505** to the medication history service provider **110**. In some embodiments of the invention, as explained in greater detail below, the request **505** may be communicated to the healthcare service provider aggregator **112** via a suitable web portal or other Internet based application. Alternatively, in certain embodiments, the request **505** may be communicated to the healthcare service provider aggregator **112** by patient management software, prescription drug software, or other applications operated by the healthcare service provider **108**, as described above with reference to FIG. **4**.

The medication history service provider **110** may receive the request **505** and process the request **505** in order to obtain patient medication history information. The request **505** may include identification information for one or more patients, for example, names of the patients, zip codes of the patients, addresses of the patients, dates of birth for the patients, genders for the patients, insurance information for the patients,

16

information concerning whether the patients have consented to their medication history information being accessed, desired dates, desired times, desired ranges of dates, desired ranges of times, etc. The medication history service provider **110** may utilize at least a portion of the identification information to obtain patient medication history information from various sources including from a medication history database, such as medication history database **138** and/or from one or more third party data sources, such as data sources **114**. The process for obtaining information from a medication history database **138** and/or from one or more third party data sources may be similar to that described above with reference to FIG. **4**. In short, medication history information **510** may be obtained by accessing the medication history database **138**. Additionally, requests **515** for medication history information may be communicated to one or more third party data sources **114**, and responses **520** including the requested information may be received from the one or more third party data sources. The medication history service provider **110** may communicate a response **525** to the healthcare service provider aggregator **112** after accessing the medication history database **138** and/or receiving responses **520** from the one or more data sources **114**. The response **525** communicated to the healthcare service provider aggregator **112** may contain a portion or all of the medication history information for the patient(s) that was obtained by the medication history service provider **108**. Alternatively, if no patient medication history information was obtained by the medication history service provider **110**, the response **525** may indicate that no patient medication history information was found. The healthcare service provider aggregator **112** may route or otherwise communicate the response **525** to the healthcare service provider **108**.

The example block diagrams and data flows illustrated in FIGS. **4** and **5** are provided by way of example only to aid in understanding the invention. It will be appreciated that different data flows for retrieving patient medication history information may be utilized in accordance with various embodiments of the invention. For example, in one embodiment, a healthcare service provider may request patient medication history information from both a medication history service provider and from one or more third party data sources using one or more appropriate software programs. These requests may be communicated directly from the healthcare service provider or routed through a healthcare service provider aggregator or hub. As another example, requests for patient medication history information may be made by a healthcare service provider aggregator or hub to the medication history service provider and/or to one or more third party data sources. Received information may then be communicated to a healthcare service provider. As yet another example, the medication history service provider may periodically requests patient medication history information from one or more third party data sources, and any received information may be reconciled with and stored in a local medication history database. Upon receipt of a request for patient medication history information, the medication history service provider may simply access the medication history database that contains the aggregated information. Indeed, many different network connections and/or data flows may be utilized as desired in various embodiments of the invention.

FIG. **6** illustrates an example flow diagram of a method **600** for providing patient medication history, according to an example embodiment of the invention. The method **600** may be utilized to receive and process requests for patient medication history that are made by patient management software,



17

prescription drug software, or other applications operated by a healthcare service provider, such as healthcare service provider **108**. These requests may or may not be routed through a healthcare service provider hub or aggregator, such as aggregator **112**.

The method **600** may begin at block **605**. At block **605**, a request for medication history information for a patient may be communicated from a healthcare service provider **605**. The request may be communicated directly to a medication history service provider, such as medication history service provider **110**. Alternatively, the request may be communicated to a service provider hub or aggregator **112** and routed to the medication history service provider **110**, as illustrated in optional block **610**. The request may include identification information for one or more patients for whom medication history information is sought. Patient identification information may include, but is not limited to, names of the patients, zip codes of the patients, addresses of the patients, dates of birth for the patients, genders for the patients, insurance information for the patients, and/or information concerning whether the patients have consented to their medication history information being accessed.

At block **615**, the request for medication history information may be received at the medication history service provider **110**. The patient identification information for the one or more patients may be extracted from the request at block **620**, and the request for medication history information may be processed by the medication history service provider at block **625**. The patient identification information may be utilized in the processing of the request. One example method for processing the request is described in greater detail below with reference to FIG. 7.

Following the processing of the request at block **625**, medication history information for the one or more patients may be communicated by the medication history service provider at block **630**. In some embodiments of the invention, the medication history information may be communicated directly to the requesting healthcare service provider **108**. Alternatively, in some embodiments of invention, the medication history information may be communicated to a service provider hub or aggregator **112** and routed to the healthcare service provider **108**, as illustrated in optional block **635**. The medication history information may be received by the requesting healthcare service provider at block **640**. The method **600** may end following block **640**.

The operations described in the method **600** of FIG. 6 do not necessarily have to be performed in the order set forth in FIG. 6, but instead may be performed in any suitable order. Additionally, in certain embodiments of the invention, more or less than all of the operations set forth in FIG. 6 may be performed.

FIG. 7 illustrates an example flow diagram of a method **700** for accessing and/or obtaining patient medication history information, according to an example embodiment of the invention. The method **700** shown in FIG. 7 may be utilized to process a request for patient medication history information. During the processing of the request, patient medication history information may be obtained from a patient medication history database, such as database **138**, and/or from one or more third party data sources, such as third party data sources **114**.

The method **700** may begin at block **705**. A block **705**, a determination may be made as to whether patient identification information included in a received request is sufficient to access and/or obtain patient medication history information. Patient identification information may include, but is not limited to, names of the patients, zip codes of the patients,

18

addresses of the patients, dates of birth for the patients, genders for the patients, insurance information for the patients, and/or information concerning whether the patients have consented to their medication history information being accessed. A minimum amount of information may be desired in order to accurately search for patient medication history information. For example, if only a first name or only a last name of a patient are provided, it may be determined that the identification information for the patient is not sufficient. As another example, if no address is provided for a patient, it may be determined that the identification information for the patient is not sufficient. As yet another example, it may be determined that the identification information is not sufficient if no indication of patient consent to obtain medication history information is included in the request.

If it is determined at block **705** that the patient identification information is sufficient, then operations may continue at block **720**. However, if it is determined at block **705** that the patient identification information is not sufficient, then operations may continue at block **710**, and a request for additional patient identification information may be communicated to the healthcare service provider **108** (either directly or through a healthcare service provider hub). In response to the request made at block **710**, a request for medication history information may be re-submitted by the healthcare service provider **108** at block **715** and operations may continue at block **705**. Requests may be re-submitted as necessary until it is determined that the patient identification information is sufficient.

At block **720**, at least a portion of the patient identification information may be utilized to search the medication history database **138**. In this regard, medication history data stored in the medication history database **138** for the one or more patients may be located and/or identified. At block **725**, a determination may be made as to whether any information for the one or more patients is located in the medication history database **138**. If it is determined at block **725** that information for the one or more patients is located in the medication history database **138**, then operations may continue at block **730** and the medication history information may be retrieved from the medication history database **138**. If, however, it is determined at block **725** that no information for the one or more patients is located in the medication history database **138**, then operations may continue at block **735**.

At blocks **735-745**, which may be optional in certain embodiments of the invention, information may be requested and received from one or more third party data sources, such as data sources **114**. At block **735**, medication history information for the one or more patients may be requested from one or more third party data sources **114**. The requests may include at least a portion of the patient identification information, and the third party data sources **114** may utilize the patient identification information included in the requests to identify, locate, and/or retrieve medication history information for the one or more patients.

At block **740**, patient medication history information may be received at the medication history service provider **110** from the one or more third party data sources **114**. At block **745**, any information retrieved from the medication history database **138** and the one or more third party data sources **114** may be aggregated and/or reconciled with one another. Duplicate information may be consolidated and/or deleted. Additionally, discrepancies in the information may be identified and processed. A wide variety of methods may be utilized as desired in various embodiments of the invention to process discrepancies. For example, all conflicted information may be included in a response to a request for patient medication history information. As another example, discrepancies may



19

be identified and/or highlighted in a response. As yet another example, discrepancies may be resolved in an appropriate manner. One example of resolving discrepancies may be to determine that information received from a source that is deemed to be relatively more accurate or relatively more reliable is correct. Other methods for resolving discrepancies will be readily apparent to those skilled in the art.

As a result of the operations set forth in FIG. 7, requests for patient medication history information may be processed, the requested information may be identified and obtained if available, and the information may be aggregated together and formatted for communication to a requesting healthcare service provider **108**. The method **700** may end following block **745**.

The operations described in the method **700** of FIG. 7 do not necessarily have to be performed in the order set forth in FIG. 7, but instead may be performed in any suitable order. For example, in certain embodiments of the invention, information may be requested from the one or more third party data sources **114** prior to accessing the medication history database **138**. Additionally, various operations described in the method **700** of FIG. 7 may be performed in a parallel manner. For example, in certain embodiments, requests may be communicated to the one or more third party data sources **114** in parallel with accessing the medication history database **138**. Additionally, in certain embodiments of the invention, more or less than all of the operations set forth in FIG. 7 may be performed.

FIG. 8 illustrates an example flow diagram of a method **800** for providing patient medication history, according to another example embodiment of the invention. The method **800** may be utilized to receive and process requests for patient medication history that are made via a suitable web portal. A web server application may be hosted by a medication history service provider, such as, medication history service provider **110**. A healthcare service provider, such as healthcare service provider **108**, may utilize a suitable web access program, such as, a web browser, to access one or more web pages hosted by the web server application. These one or more web pages may facilitate the receipt of requests for patient medication history information and may further facilitate the communication and/or presentation of medication history information to the healthcare service provider **108**. Examples of web pages that may be utilized in accordance with certain web based embodiments of the invention are described below with reference to FIGS. 9-14.

The method **800** may begin at block **805**. At block **805**, a request for a medication history web page may be received from a healthcare service provider **108**. For example, an individual at the healthcare service provider **108** may utilize a web browser application to request a medication history web page from a web server associated with the medication history service provider **110**. A uniform resource locator (URL) for the web page may be requested by the web browser application.

Following block **805**, operations may continue at block **810**. At block **810**, which may be optional in certain embodiments of the invention, a medication history log-in web page may be communicated to the healthcare service provider **108**. The log-in web page may include prompts for log-in information for the healthcare service provider **108** or for hospital service provider personnel. Log-in information may be entered into or linked to appropriate portions of the web page and communicated from the healthcare service provider **108** to the medication history service provider **110**.

At block **815**, which may also be optional in certain embodiments of the invention, a determination may be made

20

as to whether the received log-in information is valid. If it is determined that the log-in information is invalid, then operations may continue at optional block **820** and an error message may be communicated to the healthcare service provider **108**. Following communication of the error message at block **820**, the method **800** may end. Alternatively, log-in information may be re-entered by the healthcare service provider **108** and communicated to the medication history service provider **110** for verification. If, however, it is determined at block **815** that the received log-in information is valid, then operation may continue at block **825**.

At block **825**, a medication history request web page may be communicated to the healthcare service provider **108** by the medication history service provider **110**. The medication history request web page may include prompts for patient identification information. An example of a medication history request web page is described below with reference to FIG. 9. At block **830**, patient identification information for one or more patients may be entered into the medication history request web page and communicated to the medication history service provider **110** as a request for patient medication history information.

The request for patient medication history information may be processed at by the medication history service provider **110** at block **835**. One example of a method that may be utilized to process the request is described above with reference to FIG. 7. As a result of processing the request, medication history information for the one or more patients may be obtained from a medication history database, such as database **138**, and/or from one or more third party data sources, such as data sources **114**. The obtained information may also be aggregated and de-duplicated in certain embodiments of the invention. At block **840**, the medication history information for the one or more patients may be formatted for display and communicated to the healthcare service provider. The medication history information may be communicated to the healthcare service provider in one or more suitable web pages. Examples of suitable web pages for displaying medication history information are described below with reference to FIGS. 10 and 11. Additionally and/or alternatively, the medication history information may be communicated to the healthcare service provider in one or more electronic files, such as, word files, .pdf files, database files, text files, etc.

The operations described in the method **800** of FIG. 8 do not necessarily have to be performed in the order set forth in FIG. 8, but instead may be performed in any suitable order. Additionally, in certain embodiments of the invention, more or less than all of the operations set forth in FIG. 8 may be performed. For example, in certain embodiments of the invention, web pages and/or web page requests may be communicated through or routed through a healthcare service provider hub or aggregator, such as healthcare service provider hub **112**.

In various embodiments of the invention, patient medication information may be requested and/or received via one or more suitable web pages. A wide variety of different web pages may be utilized as desired in web-based embodiments of the inventions. A few examples of suitable web pages are provided in FIGS. 9-14; however, it will be appreciated that numerous other web pages and/or web page formats may be utilized in accordance with embodiments of the invention.

FIG. 9 illustrates an example web page **900** that facilitates the receipt of patient medication history requests, according to an example embodiment of the invention. The web page **900** may include one or more prompts and associated fields **905** for the receipt of patient identification information. A wide variety of different types of patient identification infor-



21

information may be received. As shown in FIG. 9, patient identification information may be received for a patient's first name, last name, insurance cardholder identification, date of birth, gender, and zip code. Additionally, an indication of whether the patient consents to the medication history request may be entered. As shown, the consent indication may be entered via a pull down menu; however, the consent indication may be entered in a wide variety of ways, such as, a pull down menu, check boxes, etc. Additionally, an indication for a period for which patient medication history is desired may be entered. Patient medication history may be requested for any time period. In certain embodiments of the invention, desired date ranges may be entered. In other embodiments of the invention, a look back period may be entered and/or selected. A wide variety of different look back periods may be entered and/or selected as desired in various embodiments of the invention. For example, medication history may be requested for the previous month, the previous year, etc. As shown in FIG. 9, a look back period may be requested via a pull down menu.

Additionally, in certain embodiments of the invention, identification information may be entered for multiple patients. A web page user may utilize appropriate check boxes 910 to enter and/or display identification information and/or the results of requests entered for additional patients. Once patient identification information is entered for one or more patients, a submit button 915 may be selected in order to submit the patient medication history request. Alternatively, a reset button 920 may be selected to clear patient identification information from the web page 900.

FIG. 10 illustrates an example web page 1000 for displaying the results of a patient medication history request, according to an example embodiment of the invention. With reference to FIG. 10, the entered patient identification information may be displayed along with information 1005 associated with the results of the request. The results may include, but are not limited to, identification information associated with the search and/or the patient, a date and time that the request was submitted, an indication as to whether medication history information was identified, and/or identification information associated with the requested healthcare service provider or healthcare service provider personnel. Additionally, a hyperlink 1010 may be provided that facilitates the display and/or receipt of detailed medication history information for the patient. Selection of the hyperlink may facilitate a download of the information and/or the display of a suitable web page for displaying the information, such as, the web page shown in FIG. 11 and discussed in greater detail below.

FIG. 11 illustrates an example web page 1100 for displaying detailed medication history information for a patient, according to an example embodiment of the invention. With reference to FIG. 10, patient identification information 1105 for the patient may be displayed along with information 1110 associated with the medication history of the patient. The medication history information 1110 may additionally be sorted utilizing a wide variety of different sorting criteria 1115. For example, the medication history information may be sorted by drug name, drug manufacturer, claim date, third-party processing system or other adjudication system, pharmacy, etc. and/or by a combination of criteria. Additionally, print and/or export or download options 1120 may be provided that facilitate formatting the medication history for printing and/or downloading the medication history information to a suitable memory associated with the healthcare service provider 108. The medication history information may be downloaded and/or exported in a wide variety of different formats as desired (e.g., .pdf, etc.)

22

FIG. 12 illustrates another example web page 1200 for receiving patient medication history requests, according to an example embodiment of the invention. FIG. 12 is similar to FIG. 9; however, in FIG. 12, the entry of patient identification information is illustrated. Additionally, the entry of patient identification information is illustrated for a plurality of patients.

FIG. 13 illustrates an example web page 1300 for sorting and/or sorting patient medication history information, according to an example embodiment of the invention. For example, patient medication history information received from the medication history service provider 110 in response to a plurality of requests for the information may be searched and/or sorted. Patient medication history information may be searched and/or sorted by utilizing a wide variety of different criteria. Examples of various criteria are illustrated in FIG. 13 and include, but are not limited to, patient identification information (e.g., name, insurance information, date of birth, gender, etc.), user information for health care service provider personnel submitting the request (e.g., user name, name, hospital identification, department, etc.), date, time, ranges of dates and/or times, and/or the status of a search request. A wide variety of statuses may be assigned to various search requests, for example, medication history found, no medication history found, need more patient identification information, re-submission of the request is required, request is pending, and/or request is complete. Additionally, more than one status indicator may apply to a search request.

FIG. 14 illustrates an example web page 1400 for displaying the results of a search or sort of patient medication history information, according to an example embodiment of the invention. As shown in FIG. 14, information associated with a plurality of requests for patient medication history information may be sorted in accordance with one or more different criteria, such as, the criteria described above with reference to FIG. 13. For each request, a hyperlink may be provided that facilitates the display and/or receipt of detailed medication history information associated with the request. Selection of the hyperlink may facilitate a download of the information and/or the display of a suitable web page for displaying the information, such as, the web page shown in FIG. 11 and discussed in greater detail above.

Many modifications and other embodiments of the invention will come to mind to one skilled in the art to which this invention pertains having the benefit of the teachings presented in the foregoing descriptions and the associated drawings. Therefore, it is to be understood that the invention is not to be limited to the specific embodiments disclosed and that modifications and other embodiments are intended to be included within the scope of the appended claims. Although specific terms are employed herein, they are used in a generic and descriptive sense only and not for purposes of limitation.

The invention claimed is:

1. A method for providing medication history information of a patient, the method comprising the following steps implemented by one or more computers:

receiving, from a plurality of pharmacies by a switch provider system comprising the one or more computers, a plurality of respective pharmacy claim transactions for a patient;

processing, by the switch system, the plurality of claim transactions to facilitate routing of the claim transactions to a plurality of claims adjudicators and routing of responses to the claim transactions from the plurality of claims adjudicators to the plurality of pharmacies;

storing, by the switch system as the claims are processed by the switch system, information associated with at least



23

one of (i) the claim transactions or (ii) the responses to the claims transactions as medication history information for the patient;

receiving, by a switch provider system from a healthcare service provider or from a healthcare service provider aggregator associated with the healthcare service provider, a request for medication history of the patient, the request comprising identification information for the patient;

accessing, by the switch provider system utilizing at least a portion of the patient identification information, at least a portion of the stored medication history information; and

aggregating, by the switch provider system, at least a portion of the accessed medication history information with patient medication history information received from one or more third party data sources corresponding to respective queries to the one or more third party data sources,

communicating, by the switch provider system, the aggregated information in response to the received request.

2. The method of claim 1, wherein the identification information for the patient comprises one or more of a name of the patient, a zip code of the patient, a gender of the patient, a date of birth for the patient, or insurance information associated with the patient.

3. The method of claim 1, wherein the request is received from the healthcare service provider and the aggregated information is communicated to the healthcare service provider in response to the received request.

4. The method of claim 1, wherein the request is received from the healthcare service provider aggregator associated with the healthcare service provider, and the aggregated information is communicated to the healthcare service provider aggregator.

5. The method of claim 1, further comprising:

communicating, by the switch provider system, one or more respective queries for medication history information associated with the patient to the one or more third party data sources; and

receiving, by the switch provider system, the patient medication history information from the one or more third party data sources.

6. The method of claim 1, wherein receiving a request for the medication history of the patient comprises receiving a request via a world wide web based application.

7. A switch provider system comprising:

at least one network interface configured (i) to receive, from a plurality of pharmacies, a plurality of respective pharmacy claim transactions for a patient, (ii) to communicate the claim transactions to a plurality of claims adjudicators, (iii) to receive, from the plurality of claims adjudicators, respective responses to the claim transactions, (iv) to communicate the responses to the plurality of pharmacies, (v) to receive, a request from a healthcare service provider for the medication history of the patient, the request comprising identification information for the patient, and (vi) to communicate aggregated medication history information for the patient to the healthcare service provider;

at least one memory comprising a medication history database, the medication history database comprising stored medication history information associated with at least one of (i) the claim transactions or (ii) the responses to the claim transactions; and

at least one computer processor configured (i) to process the claim transactions and the responses, (ii) to direct

24

communication of the claim transactions and the responses, (iii) to direct, during the processing, storage of the medication history information in the medication history database, (iv) to access, utilizing at least a portion of the patient identification information, the medication history information from the medication history database, (v) aggregate at least a portion of the information accessed from the medication history database with patient medication history information received from one or more third party data sources corresponding to respective queries to the one or more third party data sources, and (vi) to direct communication of the aggregated information to the healthcare service provider in response to the received request.

8. The system of claim 7, wherein the identification information for the patient comprises one or more of a name of the patient, a zip code of the patient, a gender of the patient, a date of birth for the patient, or insurance information associated with the patient.

9. The system of claim 7, wherein the at least one computer processor is further configured to direct communication of the respective queries for medication history information associated with the patient to the one or more third party data sources and to receive the patient medication history information from the one or more third party data sources.

10. The system of claim 9, wherein each of the one or more third party data sources is associated with a prescription benefit manager, a pharmacy switch provider, a pharmacy benefit manager, an insurance company, or a healthcare coverage company.

11. The system of claim 7, wherein the at least one computer processor receives the request for medication history information via a world wide web based application.

12. The system of claim 9, wherein the at least one computer processor is configured to access the medication history database in parallel with directing communication of the queries for patient medication history information to one or more third party data sources.

13. A method for providing patient medication history information, the method comprising the following steps implemented by one or more computers:

switching, by a switch provider system comprising one or more computers, a plurality of pharmacy claim transactions and associated adjudicated responses for a patient between a plurality of pharmacies and at least one claims adjudicator, wherein the switching comprises;

receiving, from a plurality of pharmacies by the switch provider system, a plurality of respective pharmacy claim transactions for a patient; and

processing, by the switch provider system, the plurality of pharmacy claim transactions to facilitate routing of the pharmacy claim transactions to a plurality of claims adjudicators and routing of responses to the pharmacy claim transactions from the plurality of claims adjudicators to the plurality of pharmacies;

storing, by the switch provider system, information associated with at least one of (i) the pharmacy claim transactions or (ii) the responses to the claims transactions as medication history information for the patient;

receiving, by the switch provider system from a healthcare service provider or from a healthcare service provider aggregator associated with the healthcare service provider, a request for medication history of the patient, the request comprising identification information for the patient;

utilizing, by the switch provider system, at least a portion of the identification information to access the stored

25

information associated with the plurality of switched pharmacy claim transactions;  
 obtaining, by the switch provider system, at least a portion of the stored medication history information; and  
 aggregating, by the switch provider system, at least a portion of the obtained medication history information with patient medication history information received from one or more third party data sources corresponding to queries to the third party data sources; and  
 communicating, by the switch provider system, the aggregated information in response to the received request.

14. The method of claim 13, wherein the stored information for each of the plurality of switched pharmacy claim transactions comprises at least one of a name of a patient associated with the pharmacy claim transaction, a zip code of the patient, a gender of the patient, a date of birth for the patient, or insurance information associated with the patient.

15. The method of claim 13, wherein the received identification information for the patient comprises one or more of

26

a name of the patient, a zip code of the patient, a gender of the patient, a date of birth for the patient, or insurance information associated with the patient.

16. The method of claim 13, wherein the request is received from a healthcare service provider and the at least a portion of the stored information is communicated to the healthcare service provider or the healthcare service provider aggregator in response to the received request.

17. The method of claim 13, further comprising:

communicating, by the switch provider system, the respective queries for medication history information associated with the patient to the one or more third party data sources; and

receiving, by the switch provider system, the patient medication history information from the one or more third party data sources.

\* \* \* \* \*



UNITED STATES PATENT AND TRADEMARK OFFICE  
**CERTIFICATE OF CORRECTION**

PATENT NO. : 8,538,777 B1  
APPLICATION NO. : 12/165031  
DATED : September 17, 2013  
INVENTOR(S) : Elizabeth S. Kaye et al.

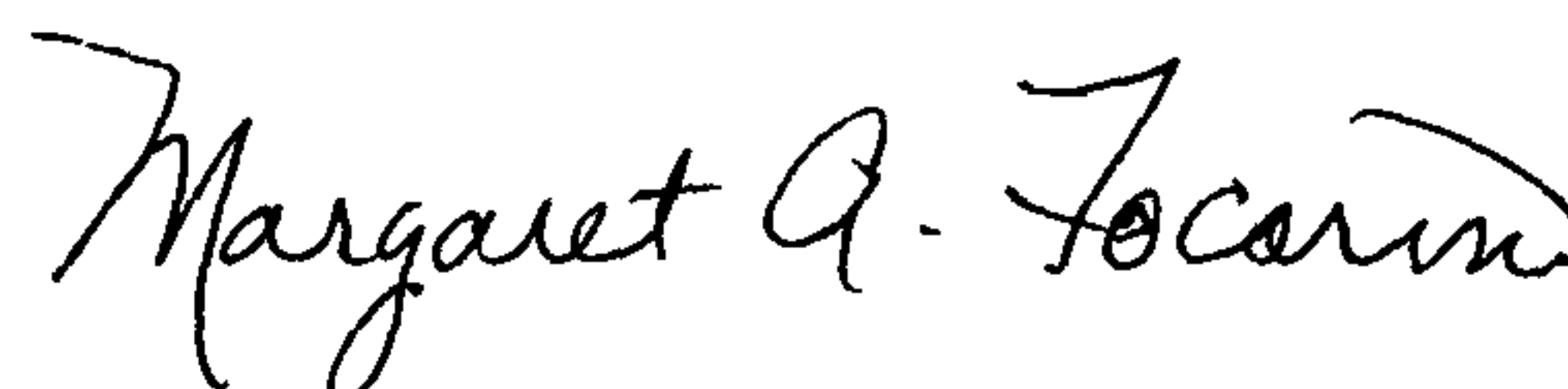
Page 1 of 1

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In the Claims

At column 23, line 60, delete “service” and insert -- switch --.

Signed and Sealed this  
Third Day of December, 2013

A handwritten signature in black ink, reading "Margaret A. Focarino". The signature is written in a cursive, flowing style.

Margaret A. Focarino  
*Commissioner for Patents of the United States Patent and Trademark Office*